FACULTY OF MEDICINE AND HEALTH SCIENCES

The role of the right hemisphere in the recovery of stroke-related aphasia: a systematic review

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Background

Neuroplasticity is the key to aphasia recovery after stroke and may occur in both the left and right hemisphere. Language recovery, spontaneous or due to various therapeutic interventions, takes place in three phases (acute, subacute and chronic) and is influenced by time-, task-, injury-, language-, person- and therapy-related variables. Especially the role of the right hemisphere in language reorganization remains a matter of debate. Therefore, a systematic review on the existing literature was performed. The research questions were based on the PICOS-principle (Moher et al., 2009):

(1) "What is the role of the right hemisphere in the acute, subacute and chronic phase in spontaneous and therapy-related aphasia recovery?"

(2) "Which variables have an influence on the role of the right hemisphere?"

Method

- Systematic review until October 15th, 2015
- Electronic databases: Web of Science & Pubmed
- Two independent reviewers
- Descriptive statistics

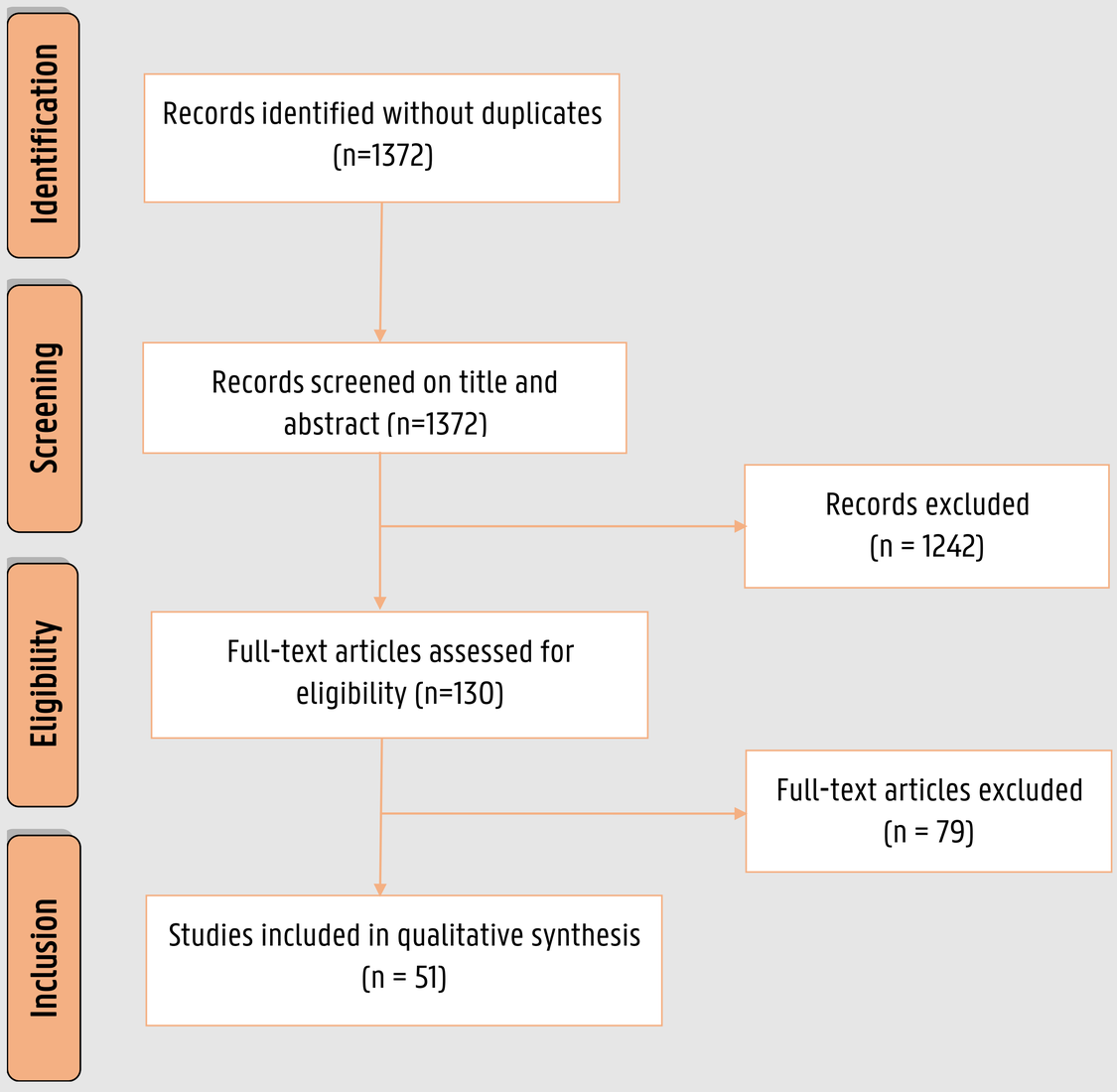

Figure: Flowchart of the study identification and selection process (Moher et al., 2009)

Results

Role of the right hemisphere in spontaneous aphasia recovery (n=5)

	Acute (n=1)	**Subacute** (n=3)	**Chronic** (n=1)
Auditory comprehension	Facilitating (1/1)	Facilitating (1/1)	Unclear (1/1)
Reading comprehension		Facilitating (1/1)	
Resting state		No role (1/1)	

Role of the right hemisphere in therapy-related aphasia recovery (n=48)

	Acute (n=1)	**Subacute** (n=3)	**Chronic** (n=44)	**Follow-up** (n=8)
Auditory comprehension	No role (1/1)	Facilitating (1/2) Unclear (1/2)	**Facilitating (5/9)** No role (2/9) Unclear (2/9)	Inhibiting (2/5) No role (2/5) Unclear (1/5)
Reading comprehension			Facilitating (1/2) Unclear (1/2)	
Verbal production		Facilitating (1/2) Unclear (1/2)	**Facilitating (14/22)** Inhibiting (2/22) No role (3/22) Unclear (3/22)	Inhibiting (1/3) Facilitating (2/3)
Reading			Facilitating (3/6) No role (1/6) Unclear (2/6)	
Resting state			Facilitating (3/6) No role (1/6) Unclear (2/6)	
Visual lexical decision		Facilitating (1/1)	Unclear (1/1)	

Variables affecting the role of the right hemisphere (n=11)

	Influence on the right hemisphere
Lesion localization (5/11)	Subcortical lesions → no role (spontaneous recovery) Intact left basal ganlia → facilitating role Lesion of inferior frontal gyrus → facilitating role
Aphasia severity (1/11)	Mild/moderate aphasia → facilitating role Severe aphasia → no role
Early start, therapy intensity & content (5/11)	Early therapy start → no role Intensive therapy → facilitating role Melodic Intonation Therapy, Phonological therapy → facilitating role

References

Cocquyt E.M., De Ley L., Santens P., Van Borsel J., De Letter M. (accepted). The role of the right hemisphere in the recovery of stroke-related aphasia: a systematic review. JNL.
Moher D., Liberati A., Tetzlaff J., Altman D.G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. Ann Intern Med.

Conclusion

The right hemisphere might contribute to early spontaneous recovery in the acute and subacute recovery phase. In chronic aphasia, the right hemisphere initially facilitates therapy-related recovery but does not support, or even inhibits, recovery in the longer term. Nevertheless, more systematic follow-up studies and further research on variables affecting the role of the right hemisphere in aphasia recovery are required.

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